

DRINKING TIMES OF KANGAROOS, SHEEP, GOATS AND EMUS IN A PASTORAL AREA

By D. R. KING

Vertebrate Pest Research Services, Agriculture Western Australia,
Bougainvillea Avenue, Forrestfield, WA 6058
Current address; 9 Lawrence Close, Darlington, 6070

G. L. NORBURY

Vertebrate Pest Research Services, Agriculture Western Australia
Current address; Manaaki Whenua-Landcare Research, P.O. Box 282,
Alexandra 9181, New Zealand

and G. J. ELIOT

Technology Transfer and Communications, Agriculture Western
Australian, P.O. Box 522, Carnarvon, WA 6701

A recent study of the efficacy of Finlayson troughs was conducted on Middalya Station, W.A. (23°54'S, 114°46'E). They are electrical devices which were designed to restrict the access of Red Kangaroos (*Macropus rufus*) and Euros (*Macropus robustus*) to water troughs (King *et al.* 1997) in an attempt to control their grazing. During those trials it became obvious that it was necessary to know the drinking patterns of Red Kangaroos, Euros and Sheep (*Ovis aries*).

Finlayson troughs consist of a trough surrounded by an electrified wire 5–10 cm above the ground at a distance of 1.1 m from the trough (Norbury 1992). While Sheep approaching the trough can easily step over the wire and drink, Red Kangaroos and Euros cannot because of the length of their hind feet and tail and they receive a shock. Preliminary

studies conducted on single electrified Finlayson troughs in late 1992 and early 1993 showed that these devices denied many Red Kangaroos and Euros access to water. However, the Finlayson troughs also resulted in an unacceptably high number of Sheep receiving shocks and being repelled from water sources when they were continuously activated (King *et al.* 1997).

Russell (1969) stated that Euros were rarely seen moving during the day. Davies (1972) presented data showing that even under relatively cool conditions Red Kangaroos and Euros drank between 1600 and 0800 hours, and Dawson *et al.* (1975) found that Red Kangaroos and Euros graze and drink mainly between dusk and dawn, while Sheep drink in the morning and evening during hot weather. Henzell and McCloud (1984)

reported that Goats (*Capra hircus*) appeared to visit watering points almost exclusively during daylight hours, but their observations were only made from 50 minutes after dawn to a short time after sunset.

On the basis of those findings, timers which inactivated the power to the Finlayson troughs during daylight hours were installed in an attempt to reduce shocks to Sheep while still restricting Red Kangaroos and Euros from drinking during the night. The timers activated the devices between 1900 and 0500 hours. Observations were made to determine whether the activation times were appropriate, and to determine the reactions of Red Kangaroos, Euros and Sheep to the Finlayson troughs (King *et al.* 1997).

Finlayson troughs were installed on 21 water points on 100,000 ha of Middalya Station. The study area consists of plains, dunes and ridges which are mainly vegetated with spinifex (*Triodia spp.*) and scattered shrubs (*Acacia*, *Eremophila*, *Maireana* and *Atriplex*) while *Eucalyptus microtheca* and *E. camaldensis* occur on alluvial plains and floodplains (Payne, Curry and Spencer 1987). Summers are hot to very hot and winters are mild. Maximum temperatures during this study ranged from 32°C to 45°C. Annual rainfall (222 mm) is variable and mainly falls between January and July. No rainfall occurred during any observation period in this study.

The Finlayson trough near Mulbia Dam was activated on 22 November 1993. Red Kangaroos

and Euros, and Sheep which attempted to drink at that water point were observed using 8 x 55 binoculars from a vehicle parked approximately 50m from the water point. It was not always possible to identify the species of kangaroo being observed, so the observations of Red Kangaroos and Euros were combined. Red Kangaroos were much more abundant among those animals which could be identified to species. Other large species of mammals, birds and reptiles which drank at the trough were also recorded.

Continuous observations for periods of 60–68 hours (beginning between 1715 and 1815) were made at Mulbia Dam on four occasions, starting on 27 October (before activation), and after activation on 22 November 1993, 10 January and 7 February 1994. Additional observations (between 1800 and 0600) were made for a total of 54 hours over nine other nights in November and for 33 hours over three nights (between 1800 and 0600) in December, 1993.

The times at which Red Kangaroos, Euros, Sheep, Goats and Emus (*Dromaius novaehollandiae*) were recorded drinking are shown in Figure 1a, 1b, 1c and 1d. Red Kangaroos and Euros drank only between 1600 and 0900 hours. In October, before the Finlayson trough was activated, all kangaroos drank between 1800 and 0600 hours. Small numbers drank before 2000 or after 0600, and the peak time for kangaroos attempting to drink on cool nights (daytime maximum temperatures between

32–34°C) was between 2100 and 2400 hours, while on hot nights (daytime maximum temperatures between 41–45°C) large numbers of kangaroos continued to attempt to drink between 2100 and 0300 hours (Figure 1a). Lower numbers of kangaroos approached the trough on cool nights than on hot nights, but many were prevented from drinking after the trough was activated.

Sheep drank throughout the entire day, but the peak drinking times were from 0500 to 0900 and from 1800 to 2100 and the number which drank during hot (18.6 per hour) and cooler days (20.4 per hour) was similar (Figure 1b). Goats mostly drank between 0700–1600, with peak drinking times between 0700–1000 and 1300–1600. Very small numbers of Goats drank between 1600–0700 (Figure 1c). Emus were observed drinking (68 individuals, group size from 1–13) throughout the daylight hours, with peak times around 1200 (Figure 1d). All Sheep, Goats and Emus which attempted to drink after activation of the trough were successful and their drinking times did not appear to be affected.

The only other species recorded as drinking were four Foxes (*Vulpes vulpes*), three Goannas (*Varanus gouldii* or *V. panoptes*), one Australian Bustard (*Ardeotis australis*), one Bush Stone Curlew (*Burhinus magnirostris*) and one corvid (*Corvus sp.*).

Our data substantiate the earlier findings of Davies (1972), that few Euros drank between 0800–1600, and by Dawson *et al.* (1975) who

suggested that Red Kangaroos and Euros drink between dusk and dawn. No Red Kangaroos or Euros drank between 0900 and 1600 during our periods of observation (Figure 1a).

The statements by Dawson *et al.* (1975) that Sheep move to and from watering points in daylight and drank in the morning and the evening during hot weather described their general drinking pattern. This study found, however, that small numbers of Sheep drank throughout the day with peak drinking times in the morning and evening (Figure 1b).

Finlayson troughs were fitted with timers which deactivated them during the peak drinking times for Sheep. The number of electrical shocks received by Sheep was substantially reduced. The shocks they received were mainly to their feet and did not deter them from approaching the water points. Activation of the Finlayson troughs only between 1900 and 0500 hours initially reduced the access of Red Kangaroos and Euros to the watering points by up to 80% when other water sources were available. However, once all other water points became inaccessible to them, Red Kangaroos and Euros found ways to circumvent the electrical devices and by February 1994 68% of those attempting to drink were successful. These methods included altering their gait (both increasing and decreasing their speed) when approaching the trough, approaching the trough sideways instead of head-on, or lifting their tail or positioning

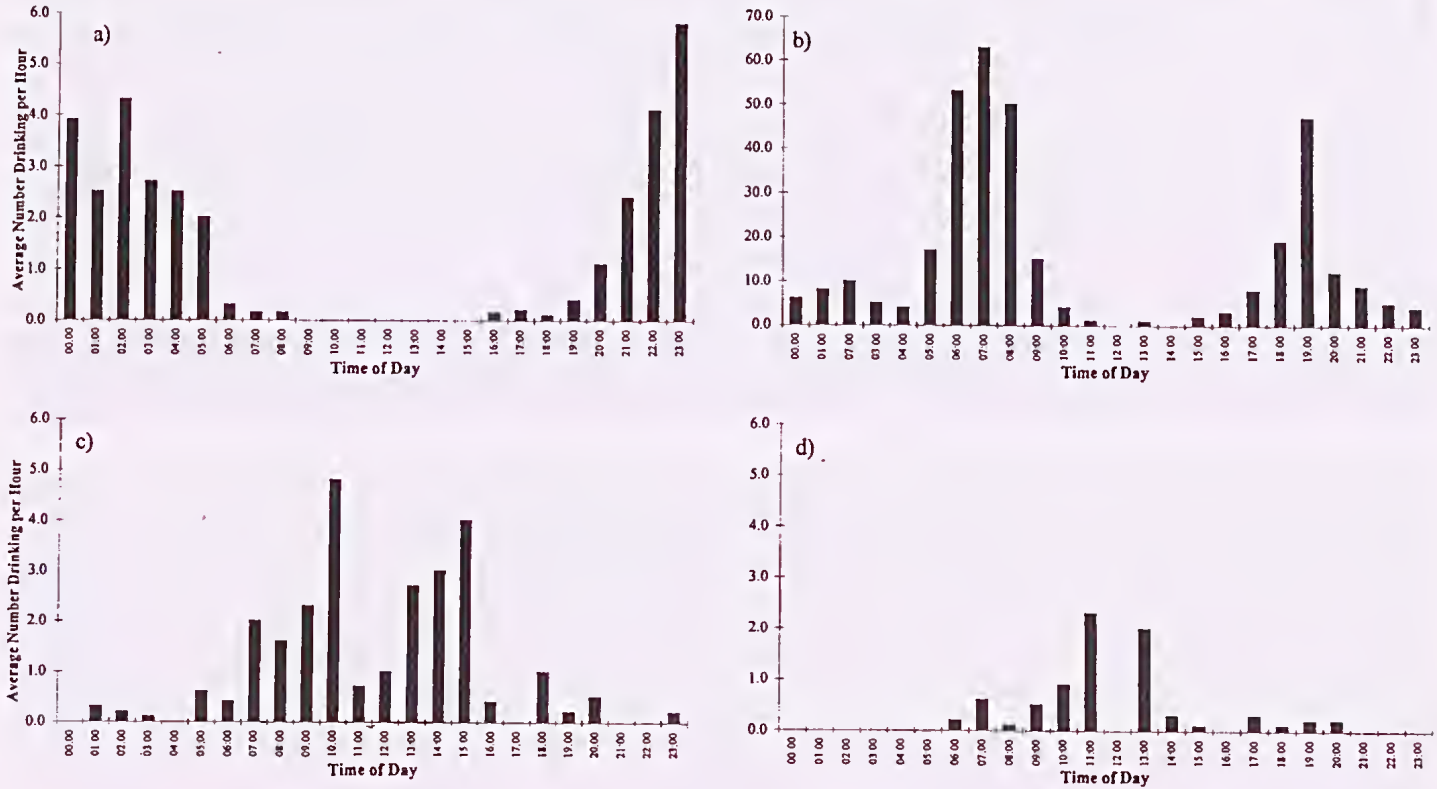


Figure 1. The Drinking Behaviour of a) Kangaroos, b) Sheep, c) Feral Goats and d) Emus at a trough on Middalya Station from October 1993 to February 1994.

their feet or tail to avoid contact with the wire when drinking (King *et al.* 1997).

Henzell and McCloud (1984) stated that feral Goats appeared to visit watering points almost exclusively during daylight. Their data show similar peak drinking periods to those found in this study. However, some Goats in our study did drink during the hours of darkness (Figure 1c).

Davies (1972) found that under cool conditions (minimum of 0°C, maximum of 30°C) Emus tended to drink in the middle of the day. Our observations (Figure 1d) show that a similar pattern occurred between late October and February when daily maximum temperatures were often over 40°C. Under both cool and hot conditions, drinking extended into the early evening.

Knowledge of the differences in drinking times of Red Kangaroos and Euros and those of Sheep allowed for selectivity in the use of Finlayson troughs to prevent access of Red Kangaroos and Euros to the water without adversely affecting Sheep, Goats or Emus. However, other behavioural traits of Red Kangaroos and Euros such as their strong affinities to their home range and their ability to learn ways of overcoming methods aimed at depriving them of access to water sources resulted in these devices being unsuitable for that purpose when used over large areas (King *et al.* 1997).

ACKNOWLEDGEMENTS

We are grateful to Darryl

Blackshaw, Doug Hearman, Kevin Mavric, Stuart Wheeler, David Blood, Kevin Shackleton and John Stretch for their patience while making observations, and to Mick and Winsome Hearman who allowed us to conduct the study on Middalya Station. The study was funded by the Australian Wool Research and Promotion Organisation and the Meat Research Corporation.

REFERENCES

- DAVIES, S. J. J. F. 1972. Results of 40 hours' continuous watch at five waterpoints in an Australian desert. *Emu* 72: 8-12.
- DAWSON, T. J., DENNY, M. J. S., RUSSELL, E. M. and ELLIS, B. 1975. Water usage and diet preferences of free-ranging *Macropus rufus* and *M. robustus*, *Ovis aries* and feral *Capra hircus* in the Australian arid zone during summer. *J. Zool., Lond.* 177: 1-23.
- HENZELL, R. P. and MCCLOUD, P. I. 1984. Estimation of the density of feral *Capra hircus* in part of arid South Australia by means of the Petersen estimate. *Aust. Wildl. Res.* 11: 93-102.
- KING, D. R., NORBURY, G. L. and ELIOT, G. J. 1997. The efficacy of Finlayson troughs as a means of repelling *Macropus rufus* and *M. robustus* from water and altering grazing pressure in pastoral areas. *Rangel. J.* 19: 57-69.
- NORBURY, G. L. 1992. An electrified watering trough that selectively excludes kangaroos. *Rangel. J.* 14: 3-8.

PAYNE, A. L., CURRY, P. J. & SPENCER, G. F. 1987. An inventory and condition survey of rangelands in the Carnarvon basin. Western Australian Department of Agriculture, Technical Bulletin 73.

RUSSELL, E. M. 1969. Summer and winter observations of the behaviour of the euro *Macropus robustus* Gould. *Aust. J. Zool.* 17: 655-664.